

Biological Information Management and Delivery Subactivity

Subactivity	1999 Estimate	Uncontrol. & Related Chgs.	Program Redirect	Program Changes	FY 2000 Budget Request	Change from 1999
Biological Information Management and Delivery	11,443	302	-1,195	4,000	14,550	3,107
Total Requirements \$000	11,443	302	-1,195	4,000	14,550	3,107

Note: The Program Redirect column reflects the redirection of funds to the Science Support and Facilities activities.

Current Program Highlights

Information and Data are critical to scientific discovery and application. Researchers need to know what has been done previously and what is currently being done by other organizations to help guide studies and prevent the duplication of research and monitoring activities. Land managers rely on information and data related to biological resources to make informed land management decisions. Databases, maps, and publications are the vital sources of this information. Electronic networks enable the identification and distribution of this data and information faster than traditional methods and in formats that are easily adaptable for various uses. Rapid access to information will help guide decisions and influence management practices resulting in improved conservation of the Nation's natural resources.

Research information support is developed and maintained through sound management of the organization's information resources. The infrastructure is comprised of networks, data (spatial and non-spatial), publications (print and electronic), libraries, records management, and standards. Attention must also be directed to planning for requirements of the future as the needs to stay current intensify and new technologies emerge to facilitate the exchange of relevant information among partners and customers. This is accomplished by developing, adapting, and distributing tools and technologies that enhance managers' abilities to use scientific information to answer to resource questions, and to share and exchange data and information with others. The goal is to make the broadest possible use of the biological data collected through research and monitoring.

National Biological Information Infrastructure — Fundamental to the USGS mission is making biological data, information, and associated technologies more accessible for our customers and partners to use in making natural resource management decisions. USGS is leading the cooperative development of the National Biological Information Infrastructure (NBII) as a "national partnership" for sharing biological information to accomplish this goal.

The NBII uses the capabilities of the World Wide Web and other advanced technologies to establish a distributed "federation" of biological data and information sources through which

people can find specific information, retrieve it electronically, and apply it to resource management questions. Partners and customers in this ongoing effort include government agencies at all levels, private sector organizations, natural history museums, libraries, educational institutions, international scientific agencies and organizations, and the public.

The USGS continues to work with its partners on three major fronts in implementing the NBII: (1) make the data and information products resulting from USGS biological science research and monitoring activities electronically accessible through the NBII; (2) collaborate with public and private partners to help them make the significant biological data and information they produce more accessible to others through the NBII; and (3) work cooperatively with other agencies and organizations to develop, refine, and provide training on new tools, standards, and technologies that collectively help comprise the necessary infrastructure components of the NBII federation.

Standards Development — Standards are identified, adapted, and refined to facilitate the exchange and use of biological data and information among diverse communities using multiple computer platforms and formats. The USGS works with Federal and non-Federal partners to develop and support needed biological data and information standards as part of the NBII program. These include a national standard for scientific names of U.S. plant and animal species, a new national standard for vegetation classification and mapping, and a standard format for describing and documenting biological data sets that is based on the Federal Geographic Data Committee's Content Standards for Digital Geospatial Metadata.

Information Resources Management — The Information Resources Management infrastructure includes telecommunications, networking, office automation, records management, computer security, electronic-mail, distributed data systems, applications technologies, and the training, procurement, and technology research necessary to support each of these activities.

Technology Transfer — Technologies are identified, adapted, developed, and distributed to enhance the usability of biological data and information in a variety of formats for various purposes. Included are geographic information systems, remote sensing technologies, global positioning systems, decision support systems, scientific visualization, and computer modeling and simulation tools.

Information Transfer — Information transfer activities are an integral part of all USGS research activities. Information is distributed electronically (through the NBII and through special services such as "Fax-on-Demand"), via print media through the libraries and publications programs, and through other outreach activities (conference exhibits, fact sheets, etc.)

Publications Program — The Publications Program responds to the information needs of customers and partners at local, regional, and national levels. In addition, the program is actively involved in shaping the field of scientific literature published in peer-reviewed journals through partnerships with publishers and participation in professional scientific information societies. The publications program is linked to the National Biological Information Infrastructure program through joint initiatives designed to promote the creation and collection of citations for scientific information products. The focus of this project is to create tools that

assist USGS researchers and publishers in producing information products that document their research and inventory activities. The system will provide a searchable database of USGS information products.

Science Information System — The Science Information System, currently under development, is a web-based database that includes information such as project title, purpose, objectives, investigators, science programs, clients, and partners for all biological research and monitoring activities that are being conducted at the USGS.

Geospatial Initiatives — Geospatial initiatives address the use and application of geographic information systems, remote sensing, global positioning systems, image processing, and telemetry. The initiatives provide strategies and methodologies to meet national goals and plans relating to geospatial data development and management. They also provide guidance for sharing expertise and information. The ability of the USGS to use and apply geospatial technology across all disciplines depends upon its success in transferring this technology to field biologists and researchers as well as offering assistance to partners. Geospatial assistance is provided to a variety of users through the provision of guidance, technical assistance, tools, and training to improve and analyze their natural resources data and information and make it easily accessible.

Recent Accomplishments

National Biological Information Infrastructure — The NBII program (<http://www.nbii.gov>) continues to make significant biological databases and information products broadly accessible over the Internet. This includes data and information resulting from USGS biological science research and monitoring, as well databases collected and maintained by other agencies and organizations. Examples include several major databases on invasive animal and plant species throughout the U.S.; data on long-term studies of the effects of environmental contaminants on selected plant and animal species; and data from state fish and game agencies across the country on population sizes and distributions of various game and nongame fish and wildlife species. The NBII Clearinghouse (<http://www.nbii.gov/clearinghouse.html>) currently provides online (and searchable) access to complete descriptions of more than 400 different biological databases and/or information products (such as maps or technical reports) with descriptions of additional databases being added regularly.

Integrated Taxonomic Information System — The USGS works with other Federal agencies to continue to enhance and support the first comprehensive national database that provides free access (directly over the Internet) to standard scientific names for all United States plant and animal species. The Integrated Taxonomic Information System is accessible as part of the NBII and can be used by any customer as a standard reference on plant and animal species names and synonyms, thus making exchange of biological data between two different data sources possible, even when they may have each applied a different scientific name to the same species.

Center for Biological Informatics — By facilitating Internet access to a broad array of biological data collections and supporting unique data development activities, CBI helps

decisionmakers obtain the information needed to support the sound management and conservation of our Nation's biological resources. Public and private interests—including university researchers, students, private landowners, and the general public—are also served through these activities. Specific 1998 accomplishments include: *Data development*: This year, in cooperation with Federal, State, university, and local organizations, CBI led or supported biological data collection in 48 States and 20 National Park Service units. Through mapping of vegetation, selected vertebrate species, and current and historical land use patterns, CBI has helped characterize our Nation's environment. To aid in improving *Internet access*, CBI collaborated with State Heritage Programs and Data Centers to provide Internet access to State-developed data. Under the auspices of the Federal Geographic Data Committee (FGDC), two national standards for biological data were developed, a draft biological data "profile" of the FGDC Content Standard for Digital Geospatial Metadata; and the National Vegetation Classification Standard, an emerging standard for naming vegetation communities, established in cooperation with The Nature Conservancy and the Ecological Society of America.

Accessing Data from Natural History Collections — The USGS is collaborating with other Federal agencies, including the Department of Agriculture, Environmental Protection Agency, and the National Science Foundation, as well as many non-Federal partners in natural history museums and universities around the U.S., in developing new approaches to provide broad electronic access to data on biological specimens in all of the Nation's numerous natural history collections. These efforts will result in new NBII Internet-based tools to help customers access, learn from, and use biological specimen information from collections without having to physically visit each museum.

Data from State Fish and Wildlife Agencies and State Heritage Programs — The USGS is working with State fish and wildlife agencies around the U.S. and with the Nature Conservancy and the network of State natural heritage programs, in efforts to increase access to the biological data collected and maintained by these agencies through the NBII. Not only is this partnership data important to major USGS programs such as GAP Analysis, but decision support systems and other technologies developed through GAP are being used by State and County planners to protect and manage resources.

Habitat Information System — The USGS is currently supporting the development of information and technology transfer activities for habitat management research projects. Projects include the development of tools and decision and information systems for wetlands management, economic and ecological sustainability of the Colorado Plateau, ecology of western reservoirs, and the restoration of soils and plants in disturbed, arid lands.

Expertise Database — The expertise database provides users with access to information about subject matter available within USGS biological science and technology centers. The expertise listing includes a search engine capability so that records may be retrieved using expertise keywords. Users may search the entire database by keyword, browse the entire database for suggestions, or print the expertise list for each USGS science and technology center.

Publishing Utilities for the Biological Sciences — The Publishing Utilities for the Biological Sciences (PUBS) system is a suite of web-based software tools and databases designed to

assist in the production, access, and distribution of electronic publications that document biological research activities. The system coordinates the distributed publishing capabilities of the USGS biological science and technology centers and maximizes the visibility and benefits of electronic publishing. During 1998, the PUBS team developed a database structure and input screens, and began populating a User Profile Database which serves as a searchable directory of users of USGS biological information products, with web-based input screens that permit registration of new users. This database allows biologists and other personnel involved in creating information products the ability to target distribution of the product to the appropriate audience based on self-selected interested areas. In addition, it provides up-to-date address information to facilitate distribution. In 1998 the team also worked to refine a web-based software tool, that speeds the creation and collection of citations about BRD information products. Prototyped in 1997, MetaWebber as the tool is called, is now in use throughout USGS biological libraries and programs involved in creating metadata for information products. Metadata created using MetaWebber are being added to the NBII Clearinghouse. Existing publications databases from the science centers are also being converted to MetaWebber records and added to the Clearinghouse.

Justification for Program Change

Effective management of the Nation's biological resources is dependent upon having full access to all the pertinent scientific and technical data and information available.

Currently, however, much of the vast amount of biological resources information which has been collected and maintained by different agencies and organizations over the years is available only to the individuals or agencies that originally collected it. Others may unknowingly re-collect information that already exists, or may be unable to effectively integrate resource information from two or more different sources to effectively answer real resource management questions. As a leader in the development and application of advanced information technologies for the delivery and application of environmental science information, the USGS is proposing to meet this need through two complimentary approaches: 1) increased funding of partnership efforts with State, local, and tribal governments, academic institutions, private organizations, and others to assist these groups in creating, using, and sharing all of their spatially referenced resources data through the National Spatial Data Infrastructure (NSDI); and 2) beginning the development of an advanced, distributed computer network which will support the analysis and integration of vast amounts of biological data as part of the National Biological Information Infrastructure (NBII).

	FY 2000 Request	Program Change
\$(000)	14,550	+4,000

Community/Federal Information Partnerships (C/FIP) (+3.0 million) — As a participant in the interagency C/FIP, the USGS will fund partnership activities through matched competitive grants with State, local, and Tribal governments, other Federal agencies, academic institutions, private organizations, and others to help increase the amount of spatially referenced resources information (e.g., distributions of migratory species, geospatial extent of alien species invasions within the U.S.) available through the National Spatial Data Infrastructure (NSDI). This includes support for specific partnership activities which will accelerate the establishment of operational Gap Analysis programs in all 50 States and improve upon the application of this innovative approach for land use planning, land acquisition, and resource management. These funds will be used to expand access to and application of Gap Analysis data, on

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terrestrial and aquatic species, by supporting efforts of GAP partner agencies to develop, document and serve spatially referenced biological data sets through the National Spatial Data Infrastructure. This effort will deliver state-of-the-art information and technical capability to land managers and land acquisition planners for optimizing the biodiversity conservation values of land acquisitions without requiring substantial training or upgrades to equipment.

National Biological Information Infrastructure (+\$1.0 million) — The USGS is leading the development of the National Biological Information Infrastructure (NBII) which complements and parallels the NSDI, by focusing on increasing access to a distributed network of biological resources data from many different government and non-government agencies and organizations. In 1998, the President's Committee of Advisors on Science and Technology (in their report: *Teaming with Life: Investing in Science to Understand and Use America's Living Capital*) called for the development of the "next generation" of the NBII. The "next generation" NBII will create a network of powerful, state-of-the-art computing systems that will be used to automatically find, analyze, and synthesize vast amounts of biological resources data from multiple sources and then present the resulting information in ways specifically tailored to individual users ranging from scientists to resource managers, and to private industry, students, teachers, and others. The system will be based in a set of interconnected regional nodes at major research institutions or supercomputer facilities, with the nodes connected to the NBII's entire network of distributed biological resources data and information sources. This increase will be used to support the establishment of two initial regional "nodes" for the "next generation" NBII system; each will be established within regions which have complex biological resources issues and a diverse set of existing and potential participants (from all levels of government, academia, private industry, and non-profit organizations). One initial node will be established in the Mid-Atlantic Highlands/Appalachian region and the other will be established in the Pacific Northwest.